Volunteer Wetland Monitoring Project

The Montana Watercourse
December 2005

Summary
Wetlands provide Montana's communities with many benefits. Wetlands filter polluted water and replenish aquifers that supply many homes with safe drinking water. Wetlands near rivers absorb floodwaters preventing erosion and flood damage to homes. Many species of wildlife from birds to reptiles to large mammals breed and nest in wetland areas as well as eat and drink the wetlands rich food supply. Although they cover only a small percentage of the state's land area, wetlands are critical resources for Montana's communities.

As our awareness of the importance of wetlands grows, so does our need to protect and restore these vital areas. In order to facilitate protection and restoration of Montana's wetlands, we must first better understand them. We must know their location, condition, and the surrounding land use.

The State of Montana currently does not possess the resources to locate, assess, and monitor the condition of all its wetlands. In order to meet this need, the DEQ, Montana Watercourse (with funding from the EPA), and the Natural Heritage Program collaborated on the development of a Wetland Rapid Assessment Form. The goal of this project is to develop a form and guidebook that both the professional and volunteer community can use as a tool to identify the condition of wetlands in relation to surrounding land use. For the data collected by volunteers to be useful, it is critical to develop a form that is accepted by the scientific community and is also compatible for lay community members. Therefore, the Montana Watercourse worked closely with wetland professionals throughout the training and evaluation of RAF to ensure professional scientific oversight of the project.

The goal for this year was to determine the public interest in participating in the project, to develop training for and to test the usability of the Rapid Assessment Form and guidebook. Another part of the project included bird monitoring of the same wetlands that were assessed with the Rapid Assessment Form. A total of 22 volunteers were trained in the summer of 2005, 11 for monitoring wetlands and 11 for conducting bird surveys.

The feedback from these volunteers provided the professional community with critical insight for form and guidebook modifications. The volunteer form will be simplified by eliminating the sections that proved difficult for the volunteer community and resulted in inconsistent data.

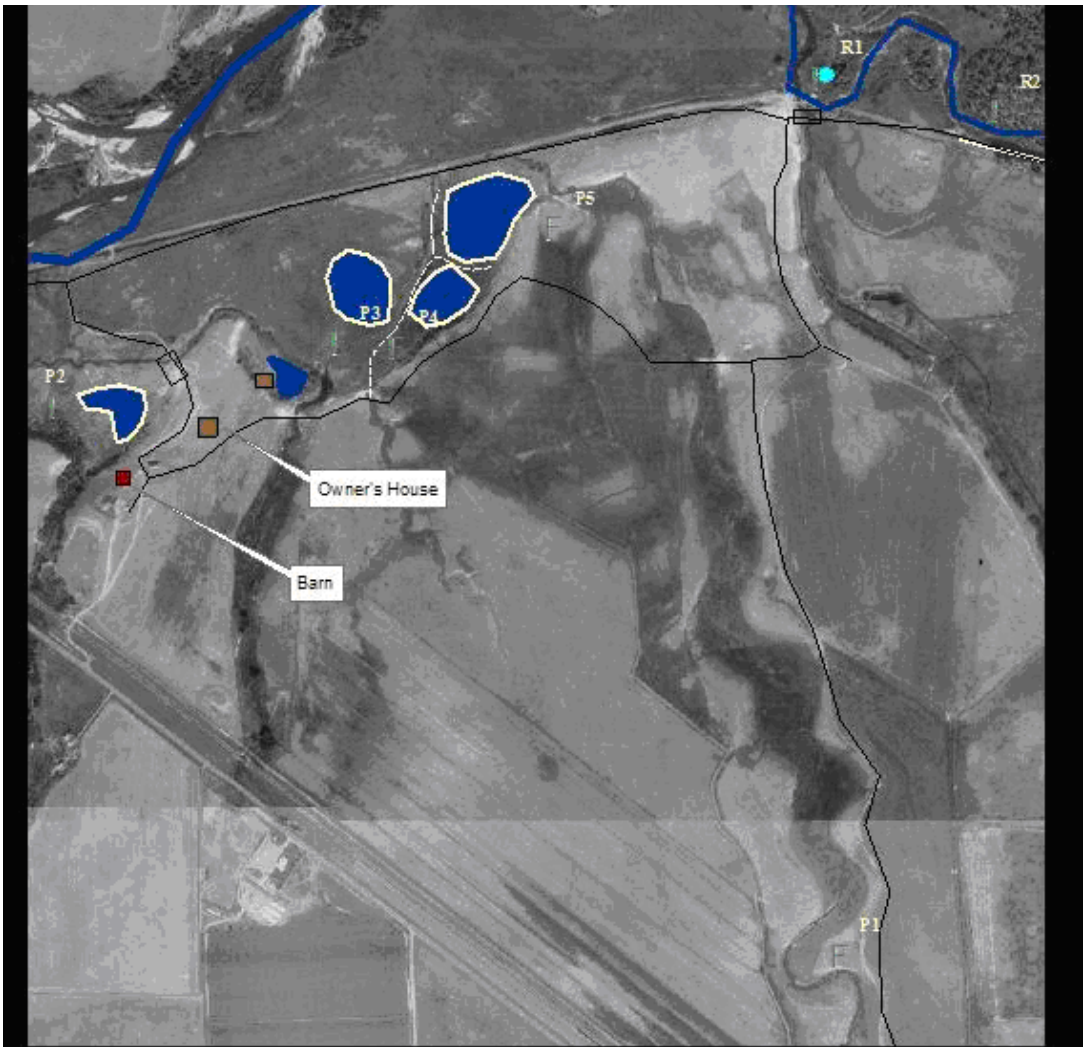
The Rapid Assessment Form will be used as the first step in gathering much needed information on the condition and location of Montana's wetlands. Assessing a large number of wetlands rapidly will facilitate the prioritization of wetland restoration projects and enhance our knowledge of which wetlands are managed successfully. Volunteer wetland monitoring programs have the potential to enhance community awareness of wetlands as well as assist the wetland professional community with preliminary data on the condition of Montana's valuable wetland resources.

Site Selection

For the pilot project, five separate sites were chosen for their public access and proximity to Bozeman. One of these sites was located outside Manhattan on private property with access granted. The locations included: Cherry River, East Gallatin Recreation Area, Sourdough Trail, Bridger Creek, and The FDD Ranch. Several of the sites included multiple wetland or riparian areas for a total of eleven sites that were monitored.

1) FDD Ranch Survey Routes
Description:
There are 5 pond and 2 riparian survey routes located at FDD Ranch, just west of Manhattan.

Map 1. FDD Ranch survey routes



Cherry River Access Survey Routes

Description:
There are 2 pond and 1 riparian survey routes at Cherry River Access. This is a Montana Fish, Wildlife, and Parks access site for the East Gallatin River.

Map 2 and 3. Cherry River Access survey route

East Gallatin River Trail Survey Routes

Description:
There are two riparian transects located along the East Gallatin River Trail. R1 is shown on the map. R2 was not evaluated by volunteers and is located immediately to the North of R1.

Map 4. East Gallatin River Trail Survey Route

Bridger Creek Survey Route

Description:
There is one riparian route on the road along Bridger Creek, adjacent to the Fish Cultural Development Center.

Map 5. Map of Bridger Creek survey route

Sourdough Nature Trail Survey Route

Description:
There is one riparian survey route located along the Sourdough Nature Trail.

Map 6. Sourdough Nature Trail survey route

Volunteer Wetland Monitoring Rapid Assessment Form and Guidebook Development

Debbie Zarnt, the Montana Watercourse collaborated with Randy Apfelbeck, Water Quality Specialist with the Department of Environmental Quality, and Erin Farris, a DEQ intern to develop a wetland rapid assessment form. The form is 10 pages in length and contains sections that evaluate: wetland type, a site map, hydrogeomorphology, vegetation condition, water quality, buffer condition, and restorability. At the end of each section, the numeric responses are condensed into an index describing the general condition of that aspect of the wetland. Debbie reviewed the form and gave written and verbal feedback over several months to ensure the forms' usability for volunteers.

Debbie also assisted with the development of a guidebook for wetland volunteer monitors. The volunteer wetland monitoring guidebook provides detailed explanations of each section of the rapid assessment form and is intended for volunteer use in the field. It contains approximately 30 pages of comprehensive instructions, pictures of different types of wetlands and wetland concepts, maps of the survey routes, and an evaluation form. The evaluation form was designed to elicit feedback from the volunteers on the usability, clarity, and areas in need of improvement for the guidebook and rapid assessment form.

Volunteer Training

Erin Farris spent a week in Bozeman at the Watercourse working with Debbie to edit the guidebook and also to create a power point to be used with training volunteers, and to visit potential field sites. One power point explains the basic concepts of the program: goals, expected outcomes, and expectations for the volunteers. The other power point covers in detail each section of the rapid assessment form and how to complete it

In July of 2005, Debbie Zarnt and Erin Farris trained 11 volunteers (including 2 MT Watercourse Volunteers) to monitor wetlands in the Gallatin Valley. Training included a two hour classroom session, one group field session, and one personal site visit. The classroom session consisted of two sections: an explanation of the project goals and expectations and an explanation of how to use the Rapid Assessment Form.

Of the 11 volunteers, 6 of them completed and returned the rapid assessment form and evaluation form. The information on these forms provided valuable feedback for the future editing of the form and the guidebook.

Results

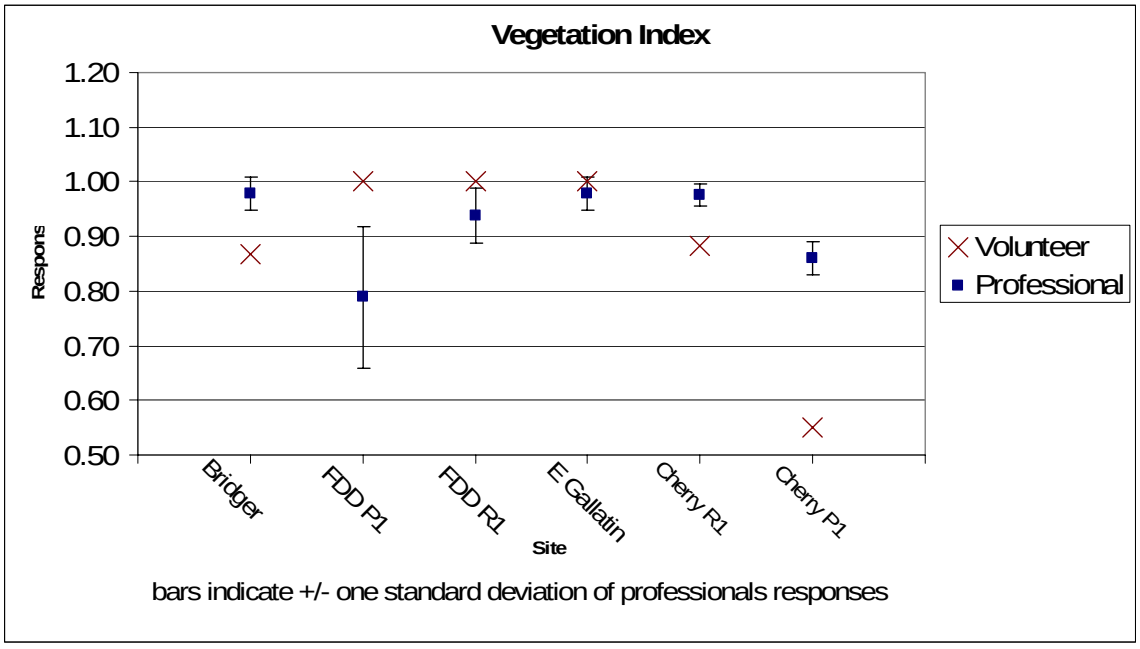
Volunteers were assigned to specific wetlands so that one volunteer evaluated each site. The six sites for which volunteers completed and returned the Rapid Assessment Forms were: Bridger, FDD P1, FDD P2, East Gallatin R1, Cherry River R1 and Cherry River P1. In August, Randy, Debbie, Erin, and Robert (another intern with the DEQ) completed rapid assessment forms for all the sites.

The numeric responses of the professionals were evaluated for mean and one standard deviation. The volunteer responses were compared with the range of the professional data within one standard deviation. Although the power of the statistical evaluation is low due to the small number of responses evaluated (3-4 professionals and one volunteer for each site), this preliminary data will provide future wetland monitoring efforts with valuable information and direction for the most appropriate next steps.

The sections not requiring numeric responses were not statistically evaluated in this report. These sections include: general site description, photos, HGM and Cowardin Classification, and a site map. The site description, map, and photos are easily completed by the volunteer community and have a potential to provide the professional wetland community and local decision makers with visual information concerning how certain wetlands are changing over time.

Vegetation Index

The vegetation index evaluates the condition of wetland vegetation on a scale of 0 -10 for six factors: the amount of bare ground, disturbance caused undesirable plants, noxious weeds, woody species establishment and regeneration, utilization of trees and shrubs, and percent of physical removal of tree/shrub layer. There are a total of 27 different types of plants or weeds to choose from. For example, if none or very few undesirable plants are identified, the wetland receives a score of 10. If large patches (>25%) of noxious weeds are identified, the wetland receives a score of 0. If the wetland contains only herbaceous species, the first three factors are averaged for the index score. If the wetland contains both herbaceous and woody species, all six factors are averaged to obtain the vegetation index.



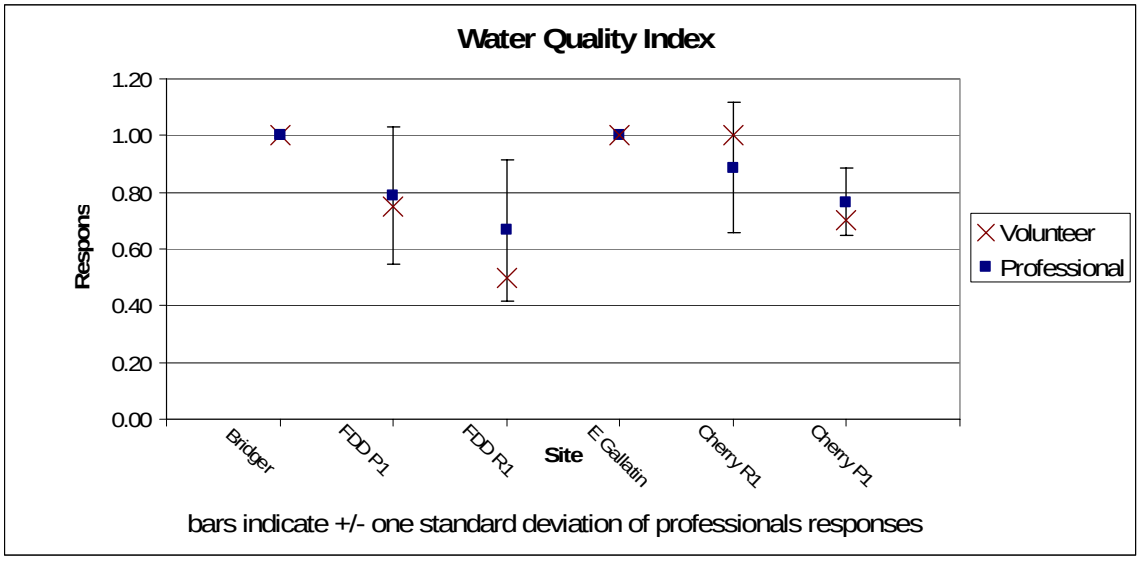
For the vegetation index scores, only one volunteer responded within the range of one standard deviation of the professionals' responses. This finding indicates that the vegetation section is difficult for volunteers and may need to be modified or eliminated from the volunteer RAF.

Riverine Index

The method utilized in the Rapid Assessment Form to evaluate riverine conditions is the same method that was developed by the Natural Resource Conservation Service for their Riparian Assessment. This method evaluates the potential versus actual condition of the river system by asking questions related to water and sediment supply, floodplain characteristics, and vegetation. For the three riverine sites (Bridger, East Gallatin, and Cherry River R1) evaluated by the professionals, there were no variations and therefore no standard deviations to evaluate the volunteer responses. However, two out of the three volunteers scored the same as the volunteers. The score for the Bridger site was a .73 versus the professional scores at 1.0. For an initial evaluation of this section of the RAF, the riparian assessment questions seem to be understood by volunteers. However, the concept of potential versus actual condition can be difficult to convey.

Water Quality Index

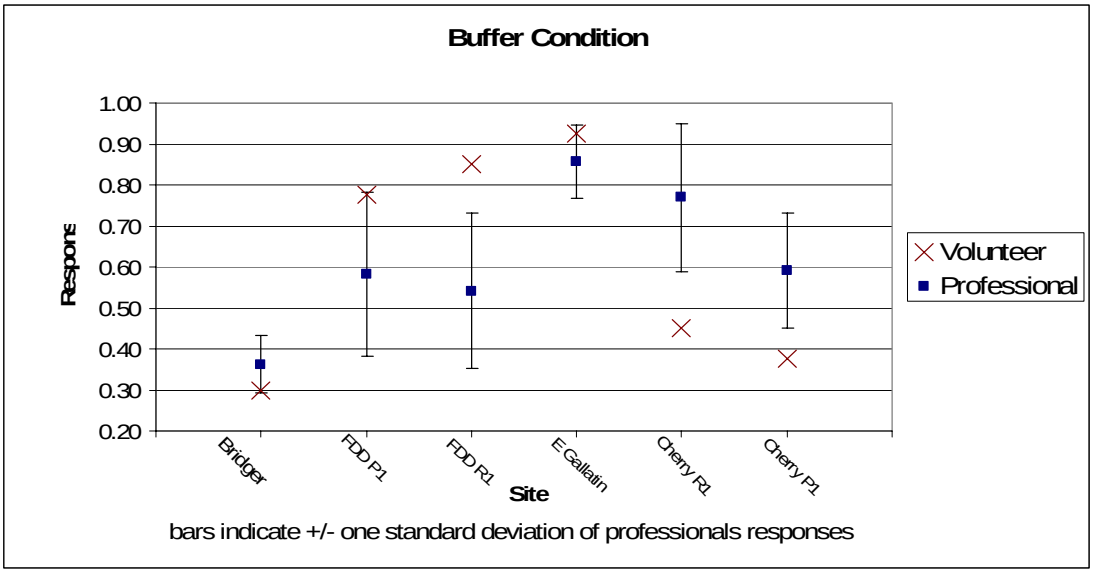
The Water Quality Index is the average of the two lowest scores out of eight questions that are answered on a scale of 0 – 10. The eight questions evaluate the amount of algae, the presence of cattails, sediment, turbidity, surface oils and foams, presence of toxics, and salinity. For example if no or minimal amount of algae is present, the wetland receives a score of 10. If there is a high level of algae growth in continuous mats, the wetland receives a score of 0.



All of the volunteers' responses were within one standard deviation of the professionals' responses. This indicates that the questions and concepts for this section may be useful to include on a volunteer rapid assessment form.

Buffer Index

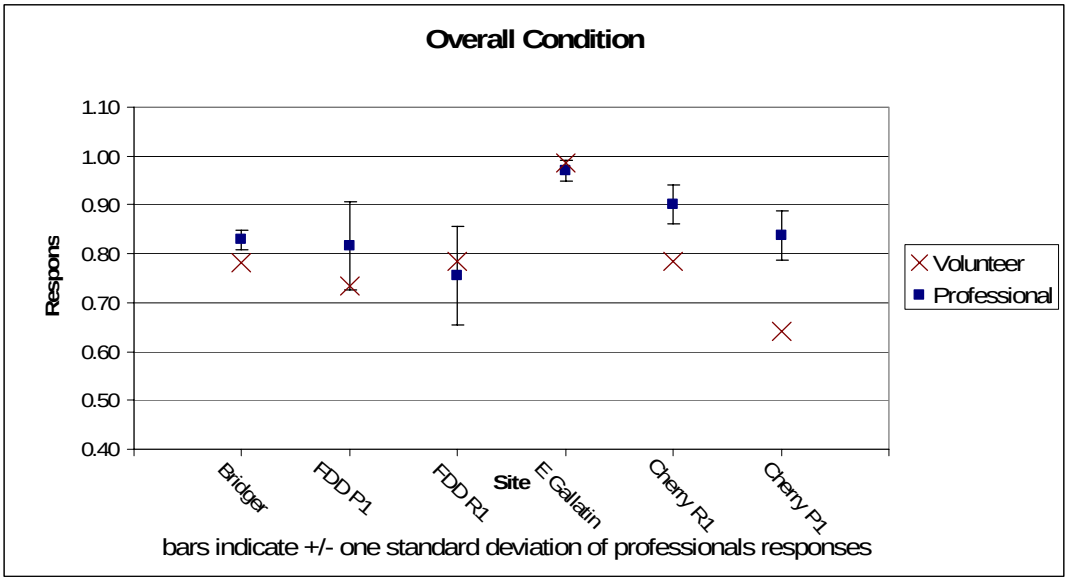
The Buffer Index is the average of the four lowest scores of 20 questions. This section evaluates the amount of stress on the buffer by estimating the amount of: bare ground, noxious weeds, undesirable plants, grazing intensity, hayfields, row crops, recreational activities, clear cuts, feedlots, residential development, dams or dikes, saline seeps, industrial or commercial activities, oil and gas development and the distance of roads from the wetland.



The buffer index responses indicate a higher level of variation among the professionals. And half of the volunteers responded within one standard deviation of the professionals responses. These results signify that further investigation is needed to determine which specific questions are causing the most difficultly. The cause of the variation in response could be the formatting or wording of the question or the need for more specific training for these questions.

Overall Condition

The overall condition of the wetland is the final score given at the end of the Rapid Assessment Form. It is a compilation of the hydrogeomorphic index, the vegetation index, the water quality index, and the buffer condition index. The results show that for the overall condition, four volunteers' scores were within one standard deviation of the professional responses.



Volunteer Bird Survey

In May and June of 2005, Debbie worked with Anna Noson of the Avian Science Center to run a Volunteer Bird Survey on the wetland sites that were chosen for the volunteer wetland monitoring pilot project.

Recruitment

Debbie recruited volunteers for the bird surveys by running an ad in the newspaper, posting flyers, and attending local Audubon Society meetings. Approximately 15 people responded to the advertisements and eleven were eventually trained and nine volunteers completed the form.

Bird Survey Methods

Volunteer bird survey methods were designed to be executed with minimal training. Birds were identified by either site or sound along a specified route. Riparian routes were 200 m in length and ran parallel to a waterway. Wetland routes were surveyed by walking the perimeter and searching the open water, emergent vegetation and woody vegetation area for birds. Sites were surveyed three times before 11:00 am between June 1st and July 15th on days with minimal precipitation and wind. Volunteers were instructed to spend no more than 30 minutes per survey and to have at least 5 days between surveys.

Bird Survey Training

Training included the development of a guidebook, a two hour meeting, and follow-up support in the form of emails and phone calls. Debbie collaborated with Anna to create a volunteer guidebook which included a bird identification assessment form to be filled out prior to

conducting the surveys, instructions on the method and timing of the bird surveys, bird abbreviation sheet, and survey forms.

Results

Results from Anna Noson are summarized below.

Volunteers
Eleven volunteers participated in the surveys in 2005. For the 9 volunteers who completed the form, self-evaluation of bird identification skills varied widely. Identification by sight averaged 69% of the 148 birds occurring in Gallatin County, and ranged from 32 to 99%. As expected, ability to identify birds by sound was lower, with an average of 28%, and a range from 0 to 77% (Appendix 3.Bird Identification Results). We ranked their skills at auditory and visual identification, and classified the results into 3 levels of birding experience. Using this method, 3 volunteers were considered beginners, 2 intermediates, and 4 advanced birders. The cut-offs used were arbitrary, but are still useful in comparing relative ability.

Bird Survey Data
All routes were surveyed from 8 June to 14 July 2005. Bridger Creek was visited separately by three different observers, three sites (Cherry Creek, FDD Ranch, and Sourdough) were visited by two observers, and East Gallatin was visited by a single observer. Survey lengths averaged 29 min, with the minimum time of 15 min taken for pond 1 at Cherry River, and the longest period of 1hr18min for the riparian route (R1) at Cherry River.

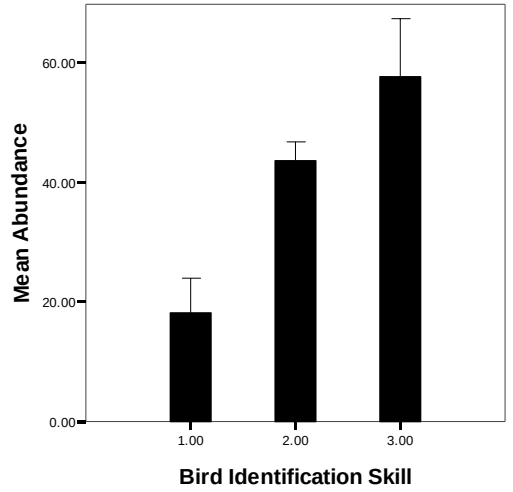
Table 1. Table showing the number of new species detected during each site visit (numbers in parentheses are from a second observer's observations).

	Bridger Creek	Cherry River			East Gallatin	FDD Ranch					Sourdough Creek
Visit	R1	R1	P1	P2	R1	P1	P2	P 3,4,5	R1	R2	R1
1	21	11	8	13	18	12	25	27	27 (27)	20	8 (20)
2	1	9	2	2	2	3	3	9	4 (7)	16	5 (4)
3	0	4	0	0	3	5	0	4	8 (8)	5	4 (2)

There were a total of 2,601 individual birds detected during the surveys (Appendix 4). 1,716 of the individuals recorded were identified visually, 196 using auditory cues, and 689 were detected using both auditory and visual cues. On average, 72% of species were observed for the first time at a site during the first visit, 11% in the second visit, and 9% in the third visit (Table 1). With all sites and surveys combined, both mean abundance and mean number of species detected per site increased with increasing bird identification skills (Fig 1). For routes surveyed by more than one observer, surveys by two advanced birders had very similar detection rates (FDD Ranch, Route 1), while intermediate birders detected more species and individuals than beginners (Fig. 2).

Figure 1. Mean a) bird abundance and b) number of species detected at sites by bird identification skill level (1 = beginner, 2 = intermediate, and 3 = advanced).

a)



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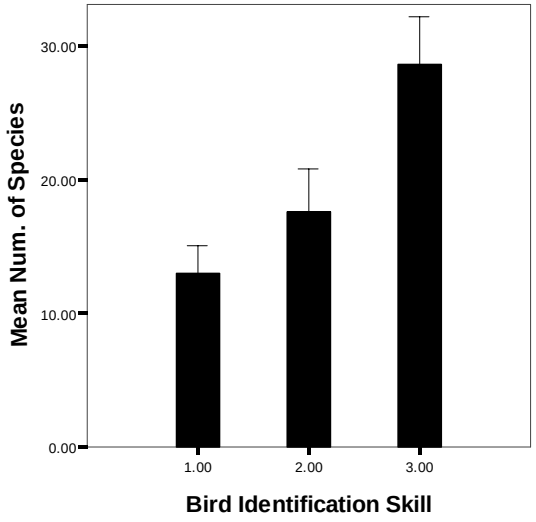
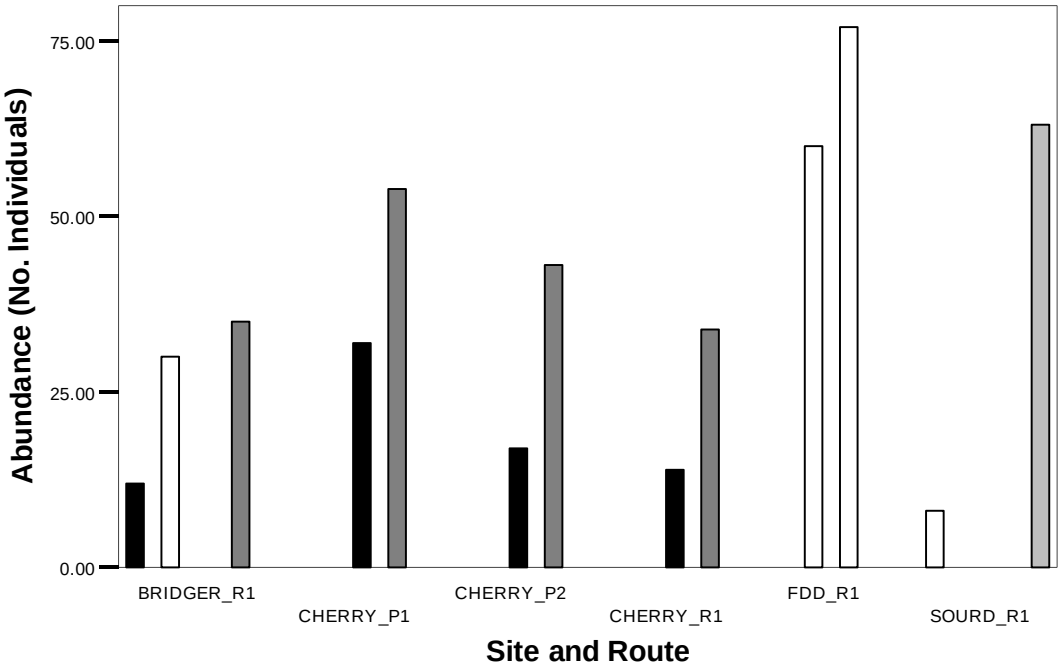


Figure 2. Number of a) individuals and b) species detected at a single visit for sites surveyed by >1 observer, and bird identification skill.

a)



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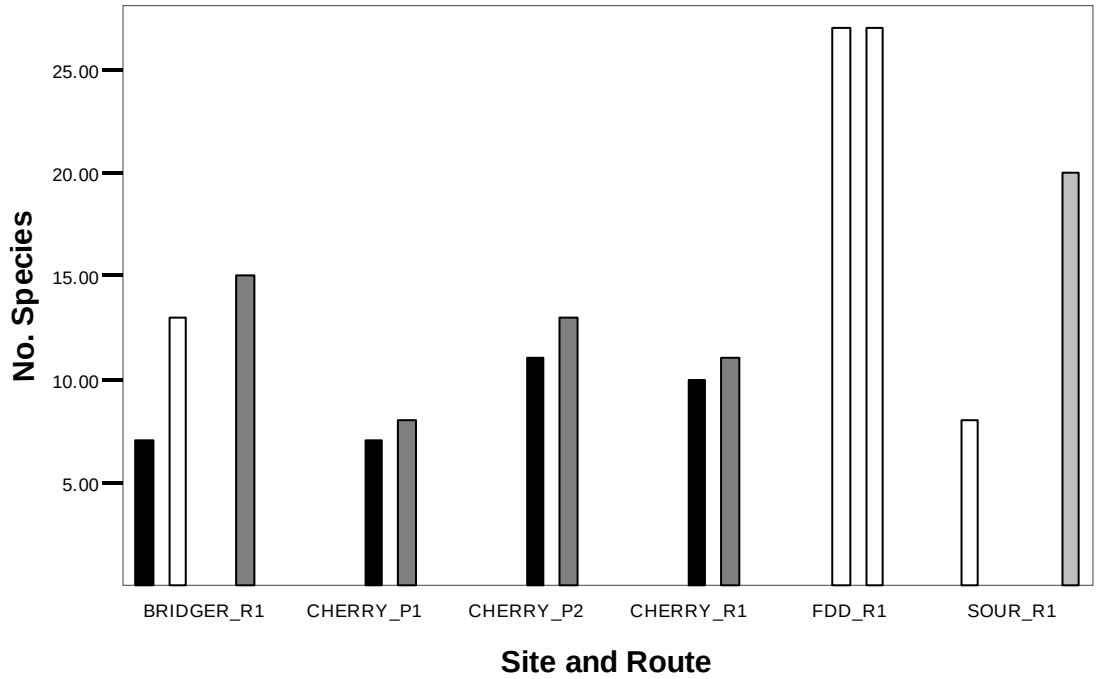

Conclusions and Recommendations

Wetland Rapid Assessment Form and Training

Volunteer response to local recruitment advertising was good with 11 people attending both the classroom and field training. The challenge will be to find volunteers who are willing to return on a consistent basis. Recommendations are to develop a public database so that volunteers can witness the fruit of their efforts and know that the data is being put to good use. Additionally, it will be helpful to find and train one local person who is dedicated and willing to serve as an organizer of local wetland monitoring efforts. This person could provide the motivation and organization necessary to sustain local wetland monitoring programs.

Return rate for completing the forms was over 50%. The length and detail of the form may have discouraged more volunteers from completing and returning the form. The results described above will assist with editing the form to make it more appropriate for volunteers.

The results from the initial evaluation of volunteer data from the Rapid Assessment Form responses show that volunteer responses for certain questions are close to professional responses. Recommendations for future edits to the form include further evaluation of the questions with high variability among the professionals and the questions that none or few of the volunteers answered within range of one standard deviation of the professional responses.

Other sections of the RAF which were not numeric were not statistically evaluated in this report. These other sections are still of potential use for management and educational opportunities. If monitoring continues on the sites, the photographs, visual descriptions, and site characterizations will be useful in increasing the understanding of how these wetlands are changing over time and are potentially impacted by development or managed successfully. In order for this information to be utilized, the volunteer monitoring program should focus on wetlands of concern and continue to expand to other areas in the state of Montana.

Volunteers commented that the training presentations and site visits were informative and helpful. Training should continue to include both a classroom and field component. The guidebook will need to be revised and updated using volunteer recommendations and the form shortened to include the sections describing the most simple objective conditions of the wetland.

Bird Survey

Overall, enthusiasm by the volunteers involved in the project was high, and their commitment level was also good. All volunteers completed the requested number of surveys, putting in at least 3 mornings of surveys in a month's time. Furthermore, most of the volunteers appeared to have sufficient bird identification skills and ability to follow

methods even with minimal training, to conduct surveys. However, the pool of volunteers was relatively small, and finding many more volunteers with advanced birding skills may be more difficult. Also, it was apparent through conversations with volunteers and the results of the evaluations that most volunteers are interested in participating at sites that are in close proximity to town.

Survey Methods & Data Quality:

- It appears that small ponds could be adequately surveyed in 30 minutes, but that riparian survey length will depend on the site. For sites with a good footpath, 30 min was adequate, but for the more typical situation of little or no trail (e.g. Cherry River R1), more time may be required.
- Most species were detected during a single visit; therefore, it may not be necessary to have volunteers repeat surveys at the same sites. Moreover, if observer surveyed more routes it would permit correction for the sometimes large variation in observer detections.
- Based on the data and the comments of volunteers, we conclude that volunteers will be most useful for bird monitoring at sites near town with easy to follow routes (i.e. trails or open vegetation).
- In the future, a sample of surveys should also be completed by trained bird survey technicians to gain more insight to quality of bird data.

Observer Training:

- Primary limitation of the quality of data recorded by volunteers was the number of blanks left on the datasheet. In future trainings, the importance of filling out all information before leaving the site should be more emphasized. Also, we recommend changing the audio and visual columns so that surveyors record “yes” or “no” to reduce the number of uninterpretable blanks.

Further Recommendations

Volunteer data can be a valuable source of information. Continuing with this Rapid Assessment Form (RAF) and Bird Surveys can assist our understanding of Montana’s wetland resources and provide land managers with important data on wetlands. Future recommendations for this project are to extend the project to other areas in MT such as Flathead, Missoula, Madison, Lake, and Park Counties. Recruiting and training will need to occur on a yearly basis for several years until the project develops a loyal following and a local person to assume responsibility. Additionally, a database should be developed for the information collected by the volunteers so that the public has access to the results of the survey and how this data will be used.

The pilot Volunteer Wetland Monitoring Project was successful in evaluating how to recruit, train, and manage volunteers. The information gathered provided important insights on how to edit the RAF and bird survey form so that the most reliable accurate data is collected. This project, if continued, has the potential to provide valuable information and educational opportunities to Montana’s communities, wetland professionals, and local and state decision makers.